20020° 22/8500r

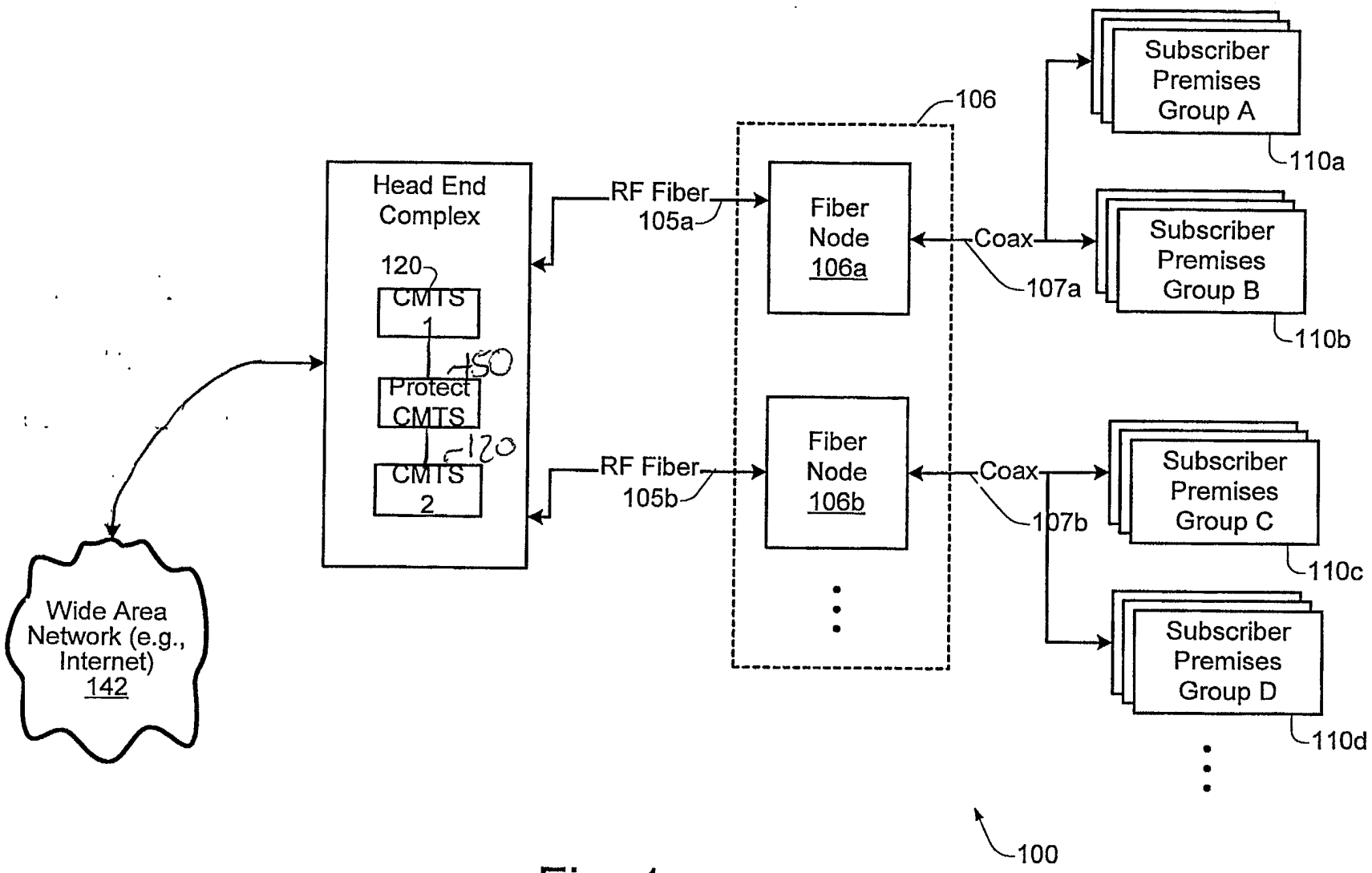

Fig. 1

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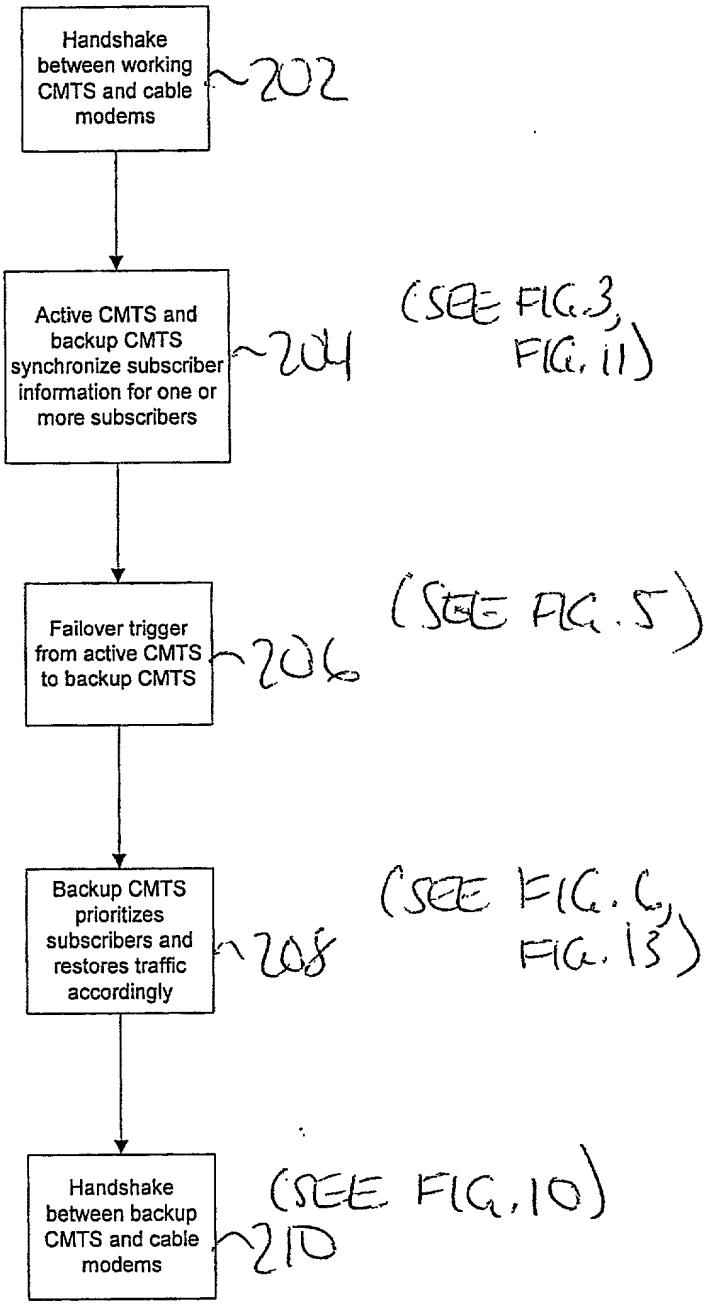

FIG. 2

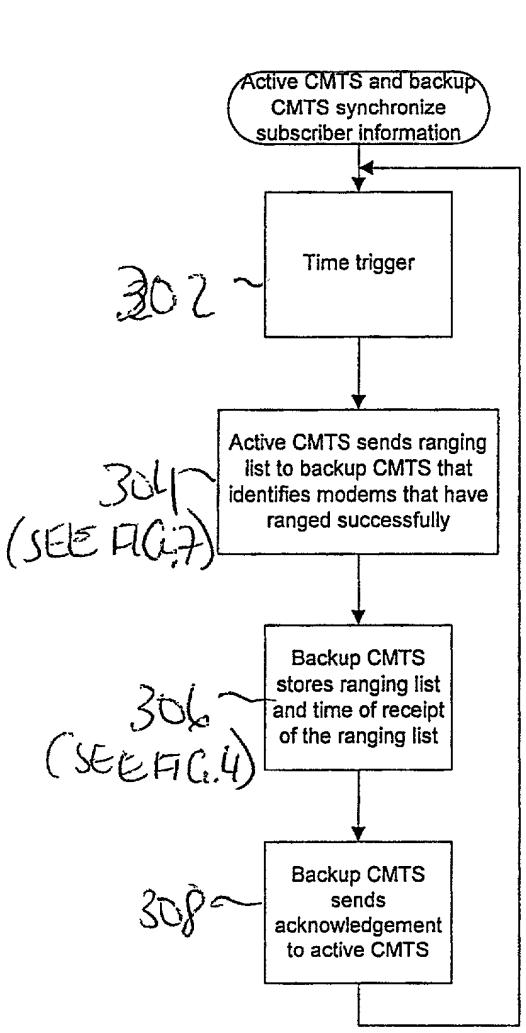
Active CMTS and backup CMTS synchronize subscriber information
Time trigger
302
Active CMTS sends ranging list to backup CMTS that identifies modems that have ranged successfully
304
(SEE FIG. 7)
Backup CMTS stores ranging list and time of receipt of the ranging list
306
(SEE FIG. 4)
Backup CMTS sends acknowledgement to active CMTS
308
204

FIG. 3

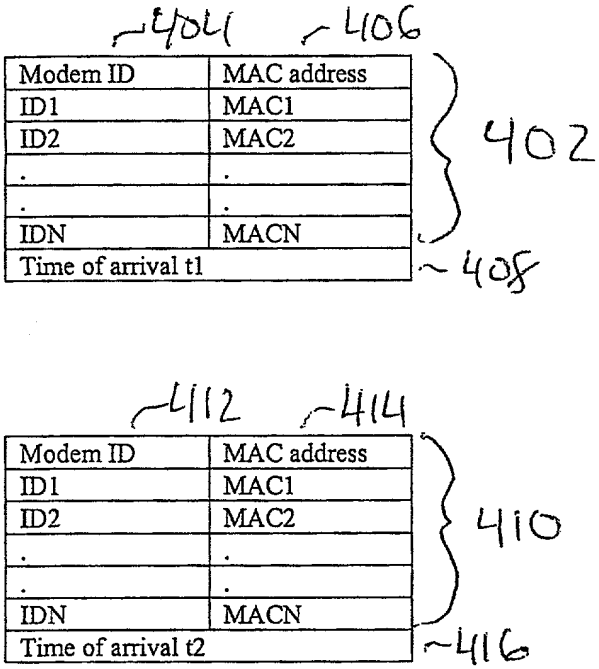

FIG. 4

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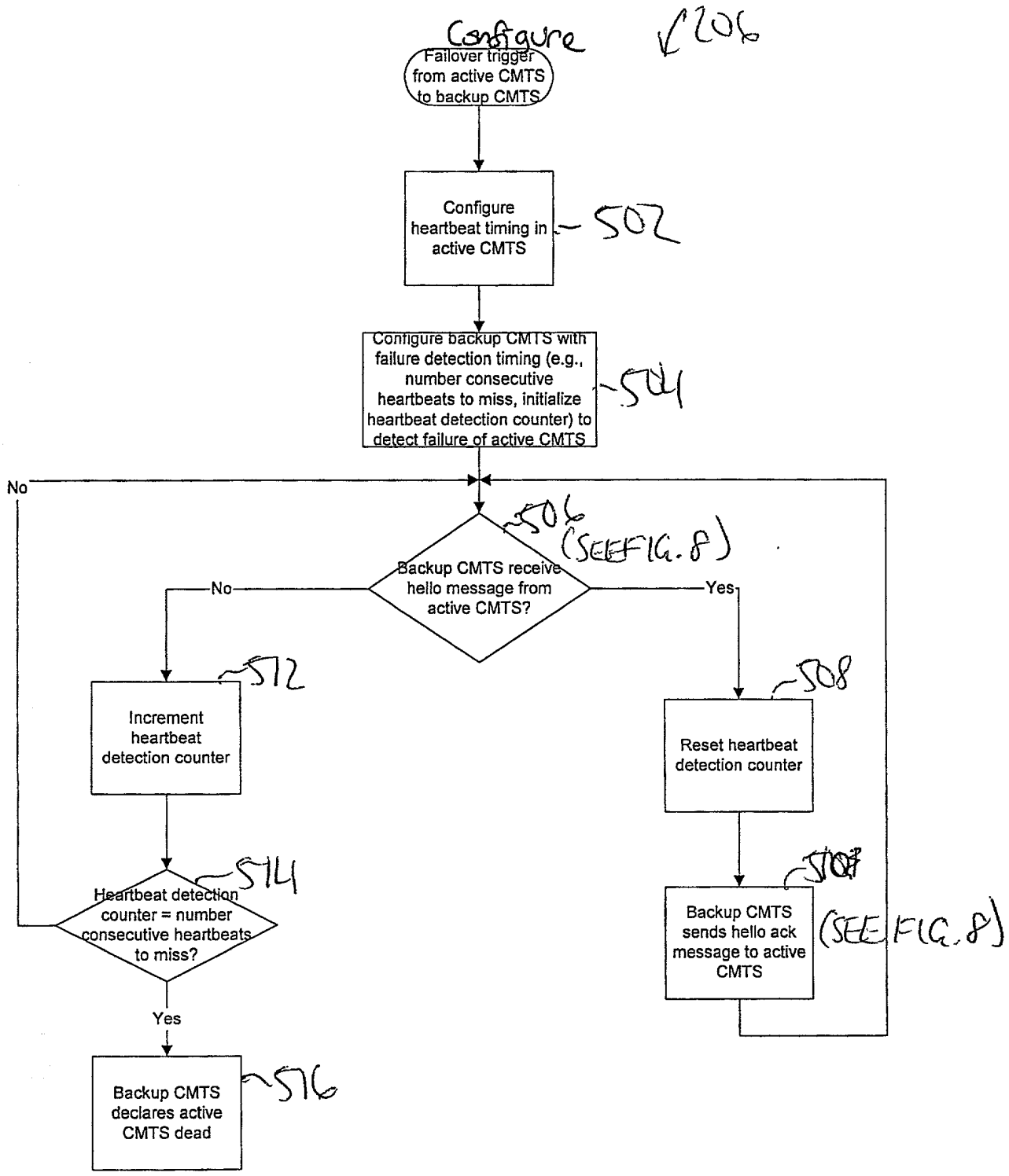
Configure
Failover trigger from active CMTS to backup CMTS
206
Configure heartbeat timing in active CMTS
502
Configure backup CMTS with failure detection timing (e.g., number consecutive heartbeats to miss, initialize heartbeat detection counter) to detect failure of active CMTS
504
No
506
(SEE FIG. 8)
Backup CMTS receive hello message from active CMTS?
No
Yes
512
Increment heartbeat detection counter
508
Reset heartbeat detection counter
514
Heartbeat detection counter = number consecutive heartbeats to miss?
510
Backup CMTS sends hello ack message to active CMTS
(SEE FIG. 8)
Yes
516
Backup CMTS declares active CMTS dead

FIG. 5

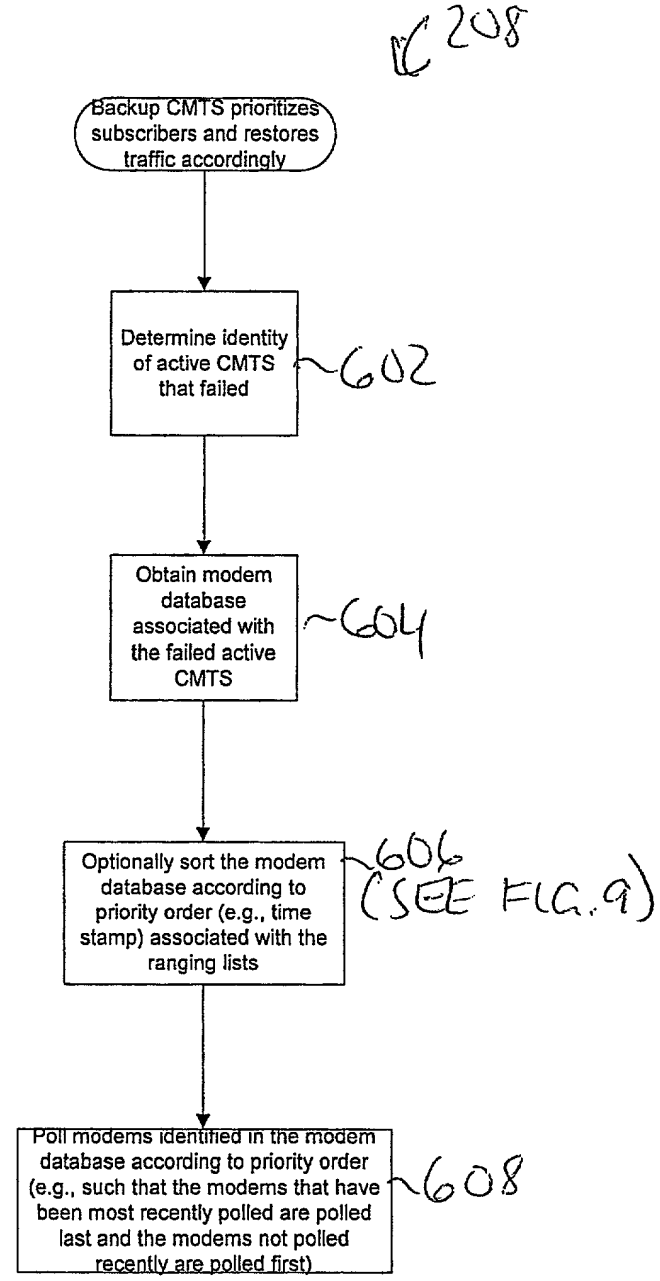
208
Backup CMTS prioritizes subscribers and restores traffic accordingly
Determine identity of active CMTS that failed
602
Obtain modem database associated with the failed active CMTS
604
Optionally sort the modem database according to priority order (e.g., time stamp) associated with the ranging lists
606
(SEE FIG. 9)
Poll modems identified in the modem database according to priority order (e.g., such that the modems that have been most recently polled are polled last and the modems not polled recently are polled first)
608

FIG. 6

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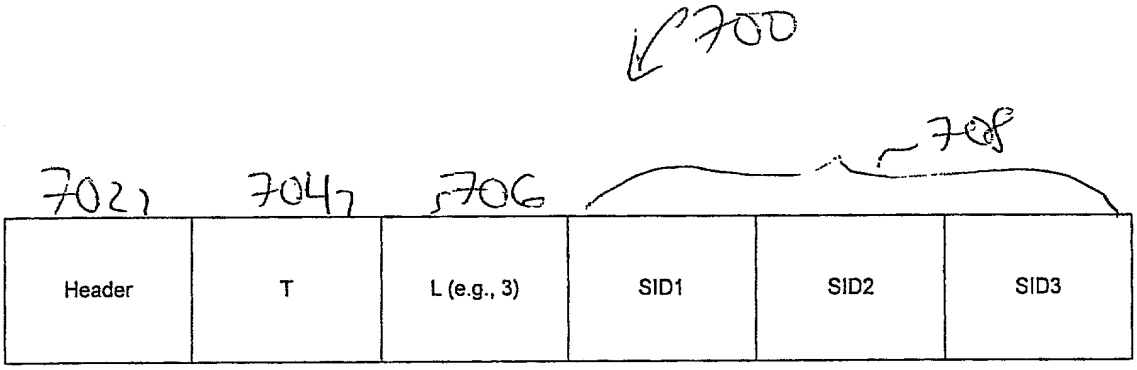

FIG. 7

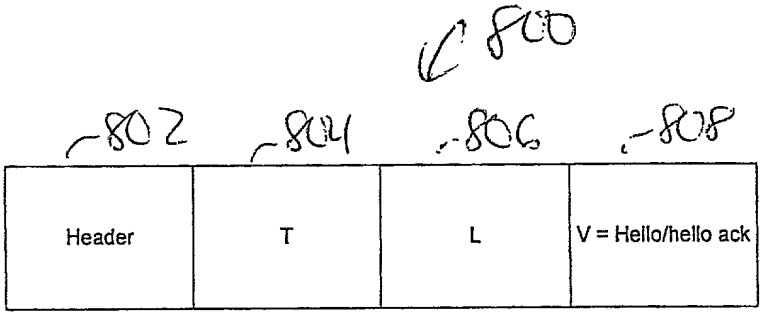

FIG. 8

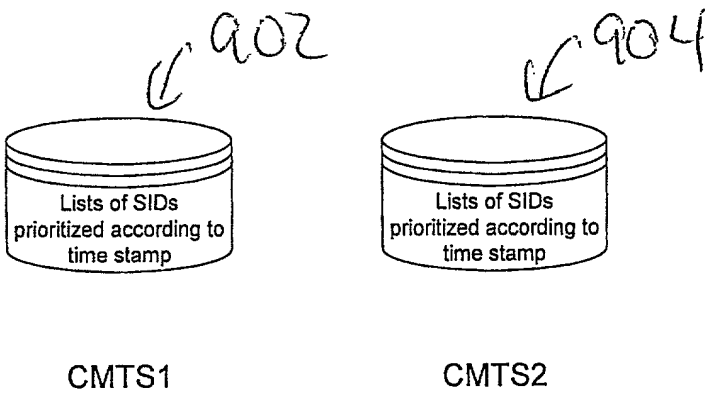
902
904
Lists of SIDs prioritized according to time stamp
Lists of SIDs prioritized according to time stamp
CMTS1
CMTS2

FIG. 9

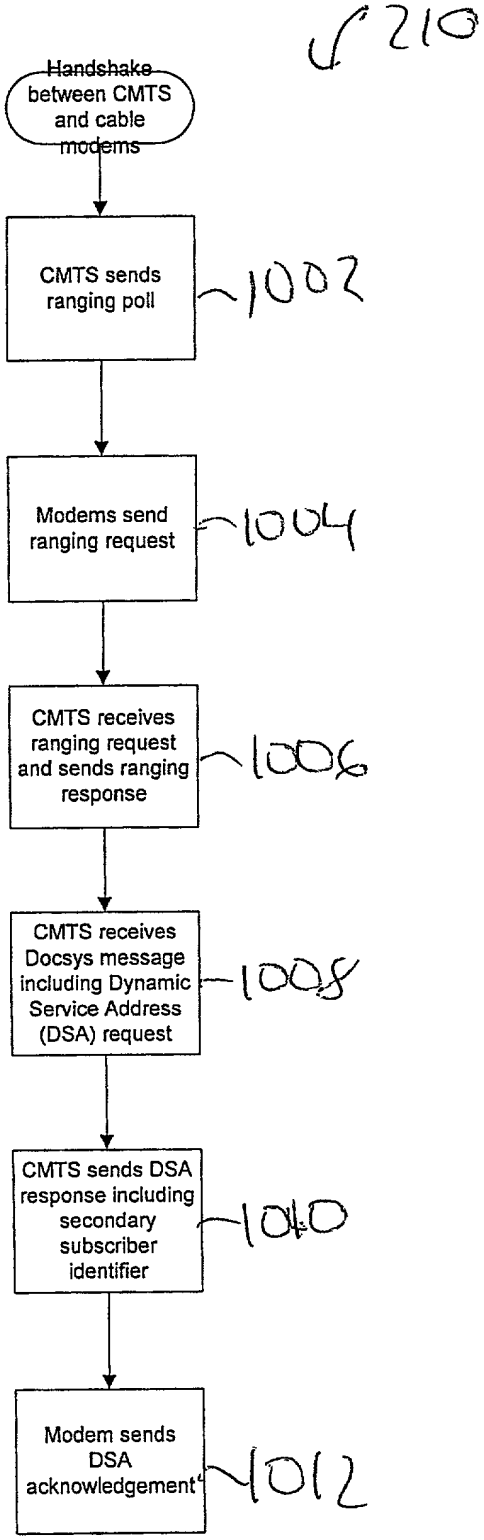
1010
Handshake between CMTS and cable modems
CMTS sends ranging poll
1002
Modems send ranging request
1004
CMTS receives ranging request and sends ranging response
1006
CMTS receives Docsys message including Dynamic Service Address (DSA) request
1008
CMTS sends DSA response including secondary subscriber identifier
1010
Modem sends DSA acknowledgement
1012

FIG. 10

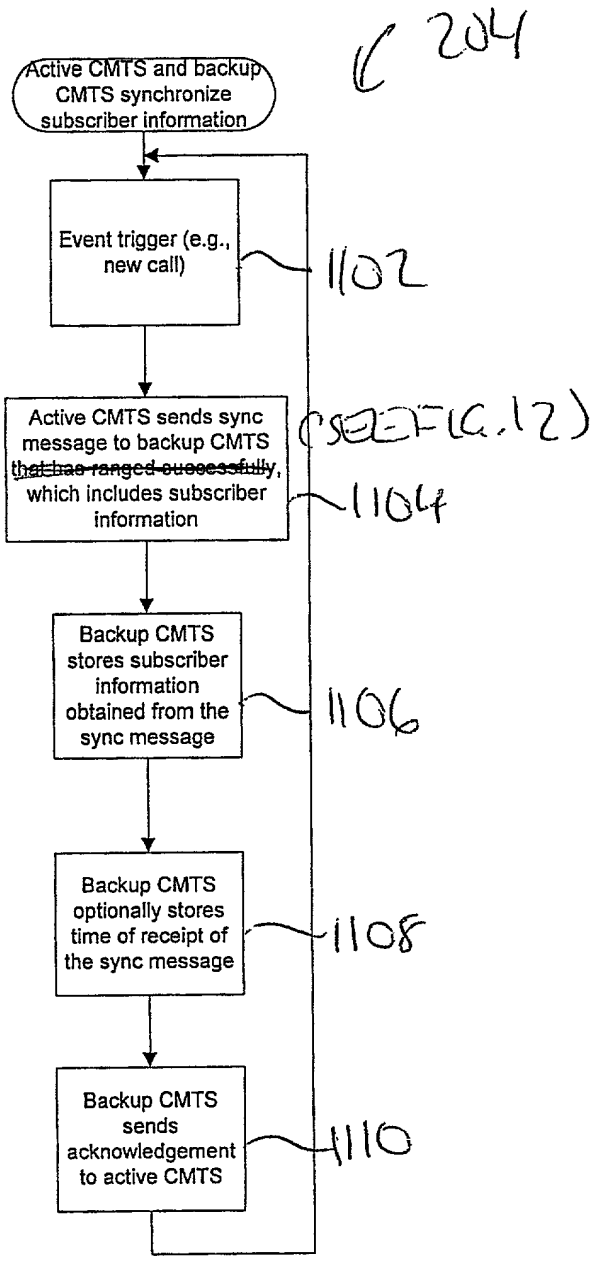
Active CMTS and backup CMTS synchronize subscriber information
1102
Event trigger (e.g., new call)
Active CMTS sends sync message to backup CMTS ~~that has ranged successfully~~, which includes subscriber information
(SEE FIG. 12)
1104
Backup CMTS stores subscriber information obtained from the sync message
1106
Backup CMTS optionally stores time of receipt of the sync message
1108
Backup CMTS sends acknowledgement to active CMTS
1110

FIG. 11

1200

Sync message

Primary subscriber ID 1202	Secondary subscriber ID 1204
Service template including QOS requirements (e.g., scheduling type) 1206	
Packet classifier 1208	

FIG. 12

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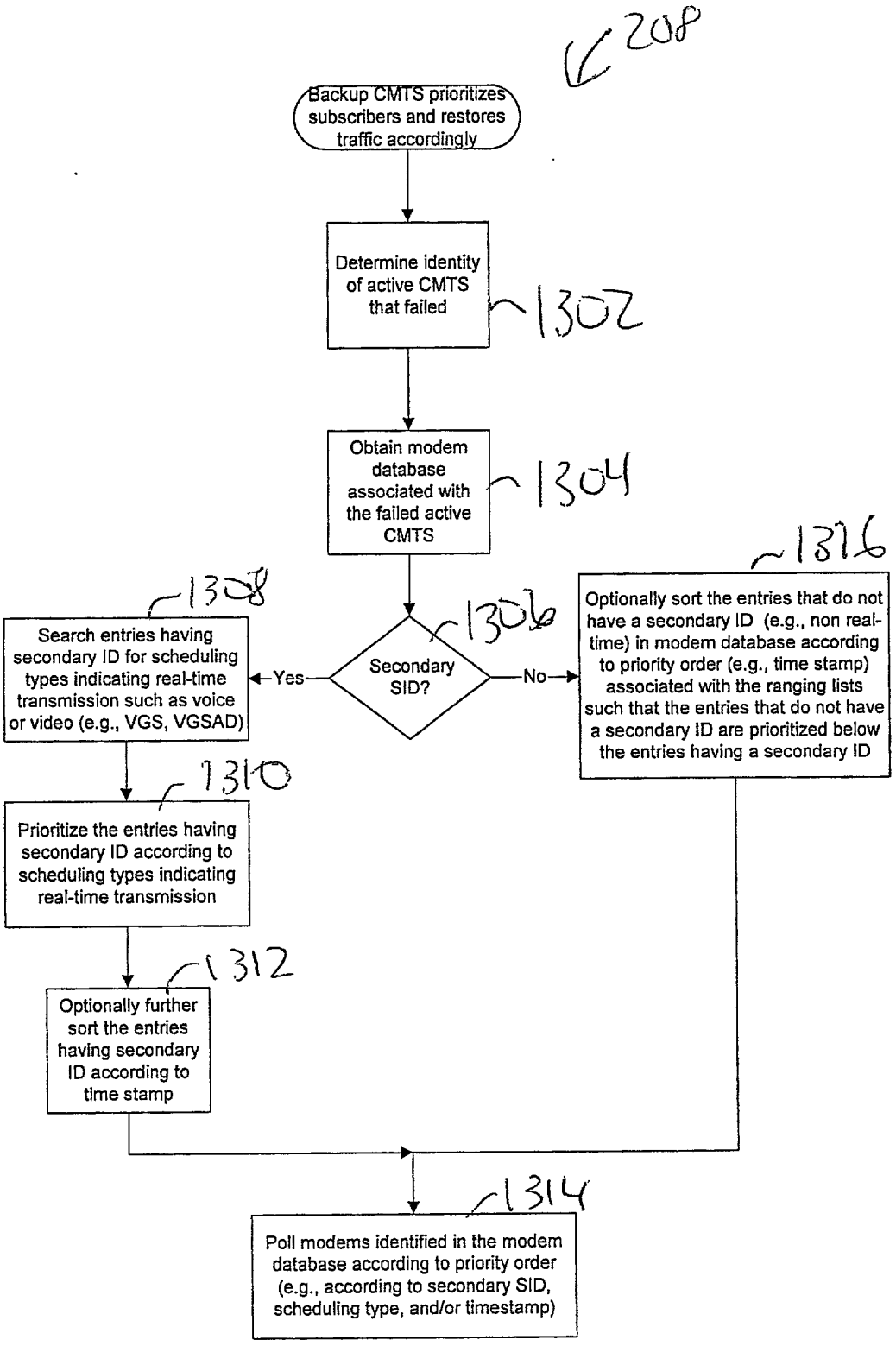
208
Backup CMTS prioritizes subscribers and restores traffic accordingly
Determine identity of active CMTS that failed
1302
Obtain modem database associated with the failed active CMTS
1304
Secondary SID?
1306
Yes
No
Search entries having secondary ID for scheduling types indicating real-time transmission such as voice or video (e.g., VGS, VGSAD)
1308
Optionally sort the entries that do not have a secondary ID (e.g., non real-time) in modem database according to priority order (e.g., time stamp) associated with the ranging lists such that the entries that do not have a secondary ID are prioritized below the entries having a secondary ID
1316
Prioritize the entries having secondary ID according to scheduling types indicating real-time transmission
1310
Optionally further sort the entries having secondary ID according to time stamp
1312
Poll modems identified in the modem database according to priority order (e.g., according to secondary SID, scheduling type, and/or timestamp)
1314

FIG. 13

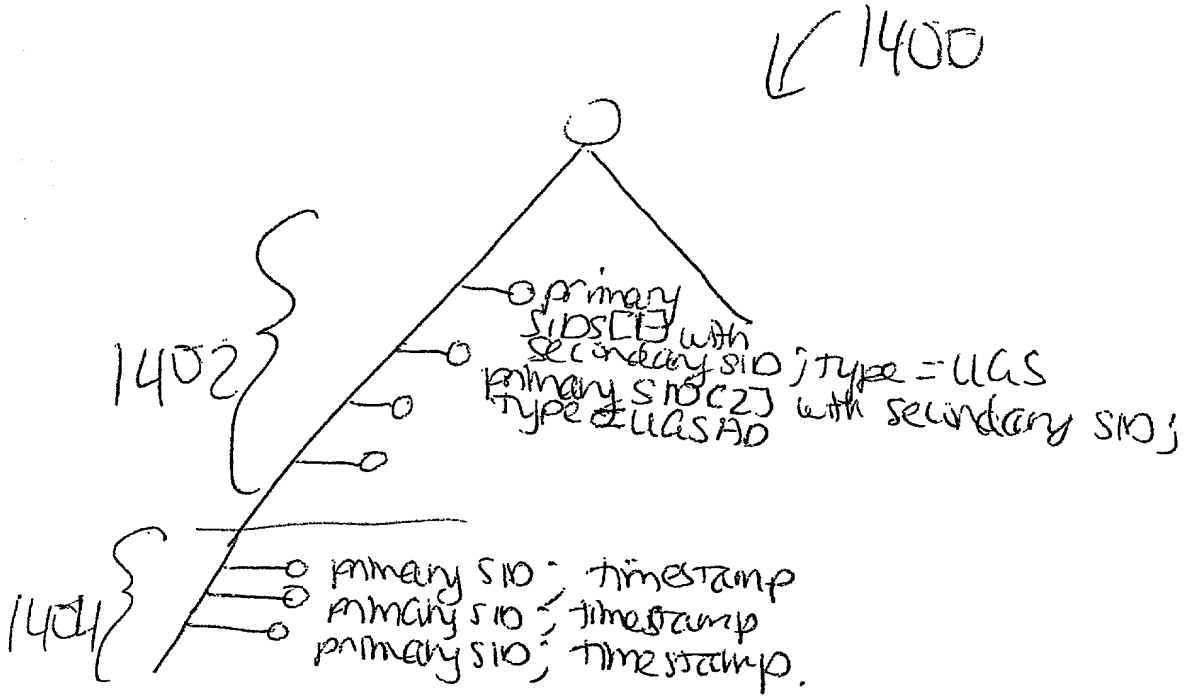

FIG. 14

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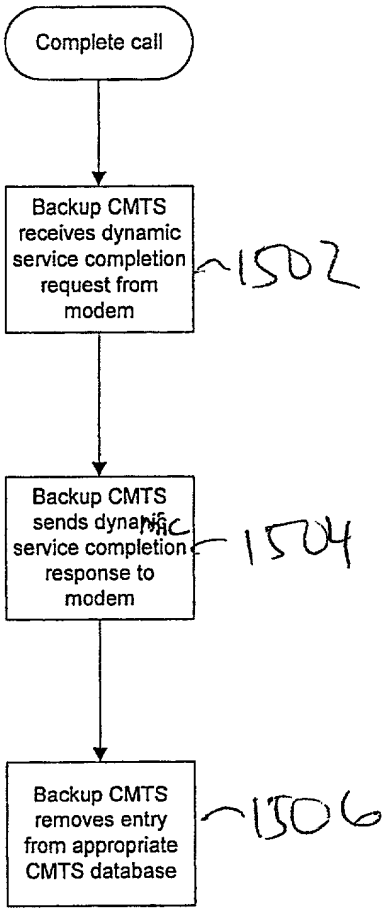
Complete call
Backup CMTS receives dynamic service completion request from modem
1502
Backup CMTS sends dynamic service completion response to modem
1504
Backup CMTS removes entry from appropriate CMTS database
1506

FIG. 15

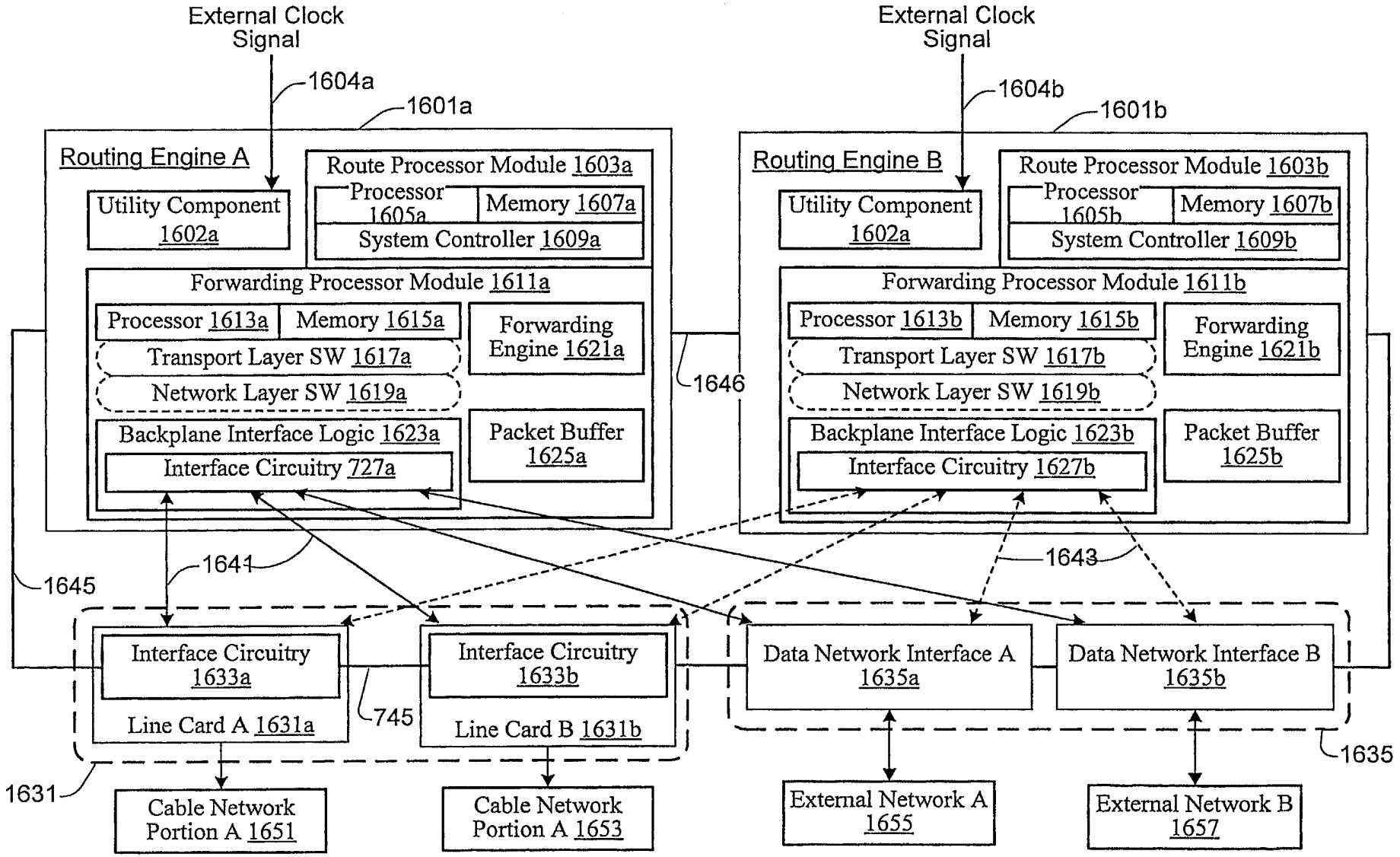

Figure 16 1600

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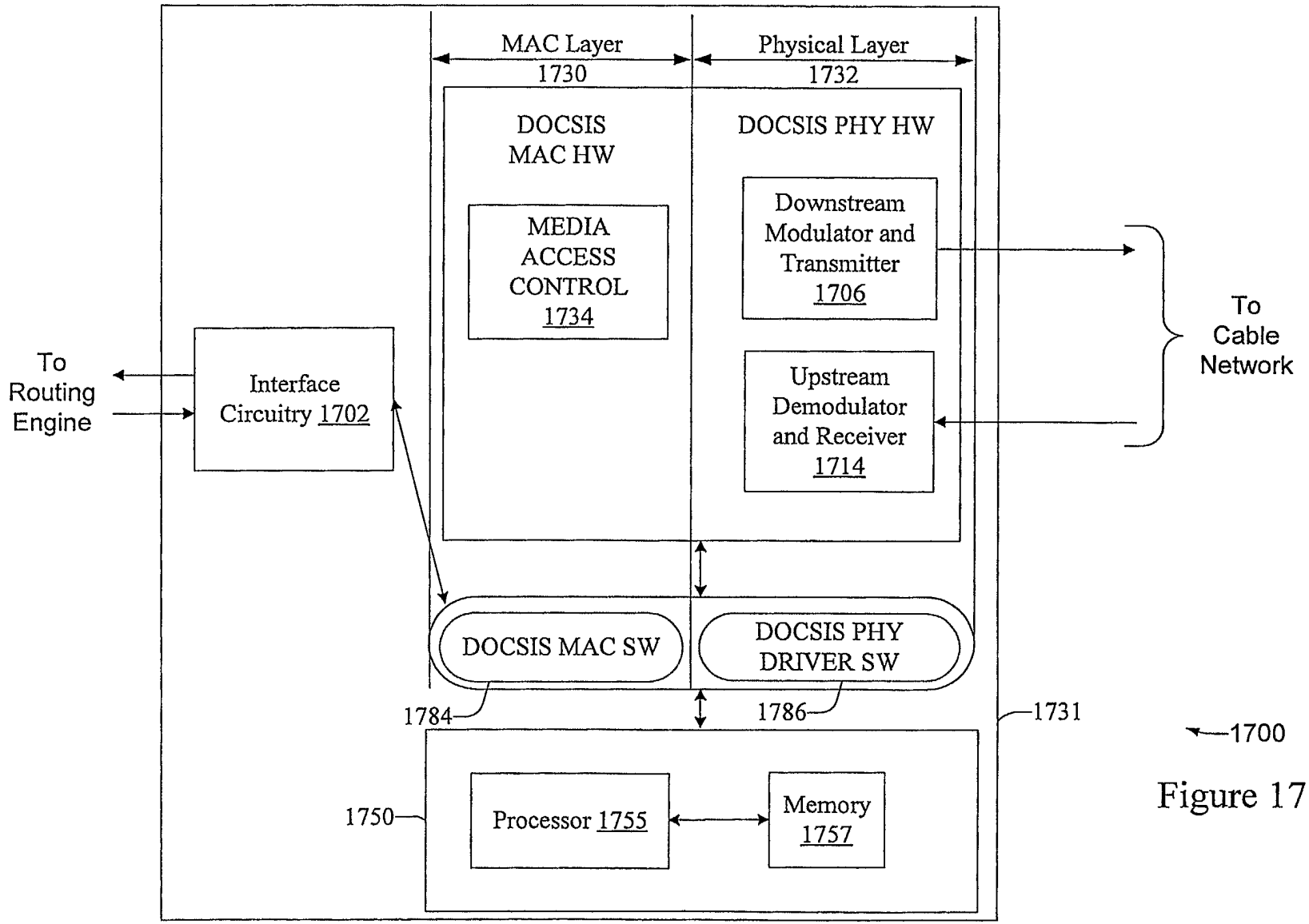

Figure 17

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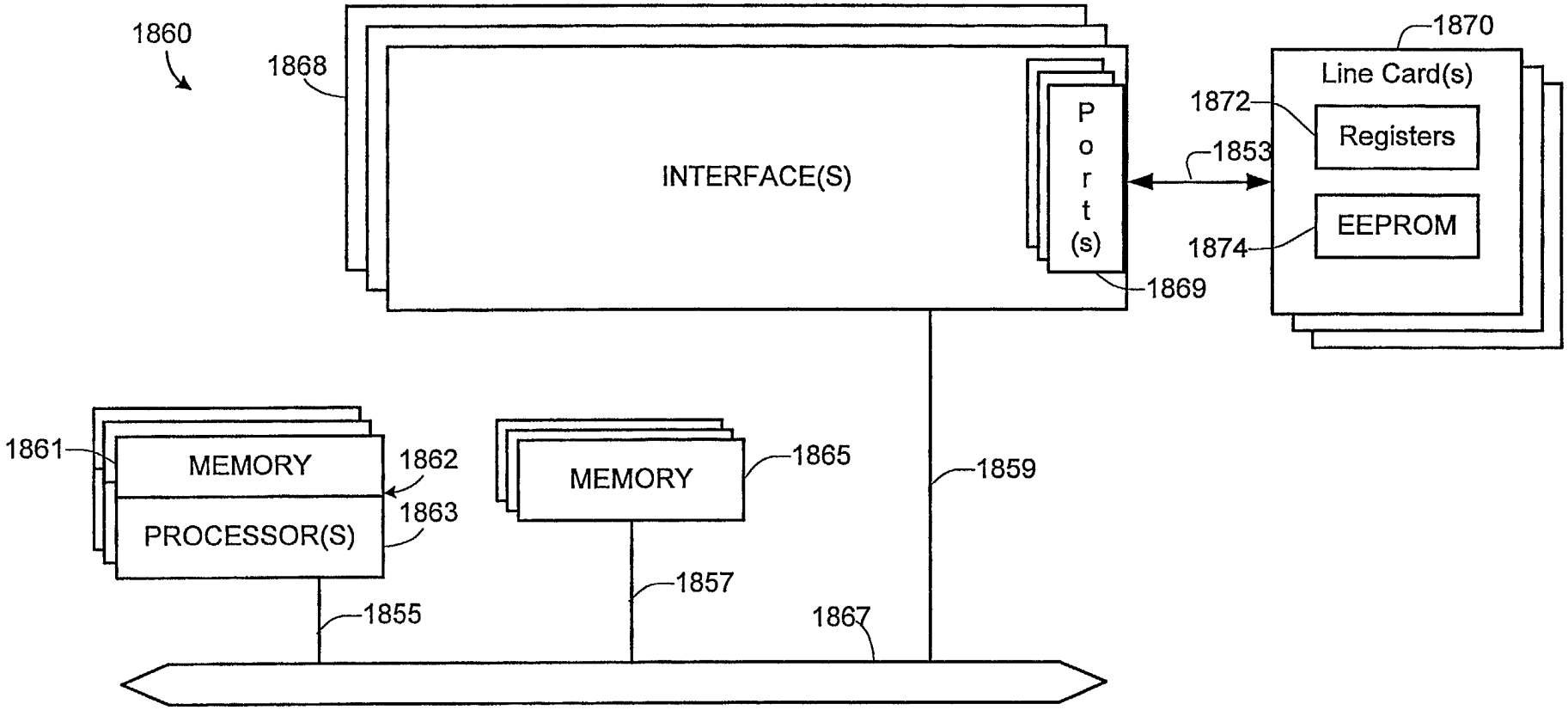

Figure 18